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Translation of French Patent No. 725,281, Group 17, Class 3, to André-Léon-Victor-Clément Debrie. Patented in France from Feb. 11, 1932; applied for Jan. 3, 1931; published May 10, 1932.

IMPROVEMENT IN MOVIE CAMERAS.

The taking of sound movie pictures requires in the camera a rapid sequence, generally of 24 picture frames per second, and at the same time, a noiseless operation. These two requirements are mutually contradictory since a noiseless operation can be achieved the easier, the lower the speed of the mechanism is.

The invention has for its object a device which makes it possible to eliminate this difficulty and is essentially characterized in that the speed of the mechanism is reduced to half, although the speed by which the picture frames pass along remains the same, that is to say, 24 picture frames per second. To this end, the picture is taken by two films which pass along in the usual way, at the speed of twelve pictures per second, the movements of these two films being shifted with respect to each other by half the exposure period for one frame, that is to say, 1/24th of a second. A picture of the object is taken every 1/24th of a second, alternately by one film and the other, one film being covered and shut-off by a shutter while the other is being exposed.

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It becomes immediately clear that this system, besides offering the aforementioned advantages, also allows very long exposure periods, 1/24th of a second and even longer if the covering period is shorter than the exposure period: this long exposure period offers great advantages, especially for color films.

The invention can be embodied in many different ways.

Five different types of embodiment are shown in diagram in Figs. 1 to 5 of the attached drawing.

Fig. 6 shows a way of projecting the films made according to the invention.

Fig. 7 shows a variant.

In the type of embodiment shown in Fig. 1, 1 is the lens of the camera; the light rays coming from this lens strike a prism or semi-transparent mirror 2, half of the light passing through this prism or mirror, so as to strike a first film 3 placed in the axis of the lens, while the other half of the light is reflected upon a second film 4, shifted by 90° with respect to the first. A single shutter or two synchronized shutters make it possible to shut-off one or the other film in succession.

In the type of embodiment shown in Fig. 2, the two films 5 and 6 are placed side by side, and in front of each a lens 7, 8, conveniently put out of center, is placed. These two lenses are arranged side by side and preferably mounted on a common frame. Each produces an image of the object on the corresponding film and, when they have a common frame, their focusing can be carried out simultaneously. Besides, in order to take the parallax into account, their spacing can be controlled by the focusing device by means of a cam, a slanting recess, or any other means. A diaphragm which can be opened to 360° and more may be used.

The type of embodiment shown in Fig. 3 has a single lens 9 and two films 10 and 11, these films facing each other and shifted by 90° on both sides of the axis of the lens. A plane mirror or a prism with total reflection 12 can swing

around a vertical shaft placed in the diametrical vertical plane of the lens, for example by means of a Maltese cross, and projects the image alternately on film 10 and 11. In this device, use of a shutter is unnecessary.

A variant of this device is shown in Fig. 4: the rotary mirror 12 is replaced by an apparatus of two plane mirrors 13, 14 placed on top of each other and at right angle, the apparatus being operated in a jerking vertical up and down movement. Of course these two mirrors could be replaced by two prisms.

In the type of embodiment shown in Fig. 5, the picture 15 transmitted by the lens 16 is not received on a film, but is taken up by two other lenses 17, 18, conveniently put out of center and focused, which alternately project an image of the same size on the two films 19 and 20. This system has the advantage of making the parallax ineffective.

Furthermore, these various types of embodiment are, of course, merely given as an illustration but in no way restrictive, and others may be conceived.

Whatever device is used, the two films obtained can be printed on two different positives, the projection taking place, for example, by using in opposite sequence the means employed for taking the pictures (stationary or movable prisms or mirrors, lenses arranged in pairs) with the same advantages concerning exposure periods; this permits reducing the brightness of the light source.

It is also possible to print the two negatives on a single positive which is projected in the usual way, the printing being, for instance, carried out in the manner shown in Fig. 6, by means of a single passing in a projecting printer,

provided with two lenses 21 and 22, conveniently put out of center; in this printer, the positive 23 moves with a speed twice as high as the two negatives 24 and 25, a shutter alternately exposing one and the other negative.

Another method consists in printing from the first negative a positive on which the pictures are separated by blank intervals as long as one picture, then to put on this device a second printing from the second negative, the positive pictures this time being placed in the aforementioned blank intervals. This operation can be carried out by means of an ordinary optical printer with a single lens.

Although in what has been said above only picture taking on two films was mentioned, it is clear that the picture could also be taken by more than two films, for instance three: in this case, the speed of the mechanism would be reduced to one third.

On the other hand, it is also possible to take by a single film at reduced speed the pictures which are taken, according to what has been said above, on two different films.

To this end, two pictures, successive in time, are made by one of the means above described at two points of the film separated by three picture frames; at the interspace a loop is provided which permits taking a picture while the preceding or following frame is shut-off.

The shutting-off must include two picture frames instead of one, but the unwinding speed of the film is reduced to half. Fig. 7 shows the position on the film of successive pictures in the period 1-2-3-4- etc. It is necessary, at the moment when the negative is printed, to re-arrange the pictures in their normal order by means of a suitable device:

it is, for example, possible, to print during a first passing the picture with odd numbers and during the second, the pictures with even numbers.

(Claims not translated)

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